

IN THE CLAIMS CANCEL

Please cancel claims 1-11, without prejudice.

IN THE CLAIMS ADD

Please add claims 12-22 as follows:

Sub 12.

A pneumatic actuator comprising:

- a housing wherein the housing includes:

- a pneumatic cylinder having an axis;
- at least one piston that can move inside the cylinder in the direction of the axis of the cylinder, wherein the piston, together with the cylinder delimits a working space;
- the at least one piston including teeth which extend in the direction of the axis of the cylinder;
- a shaft which can rotate in an axial direction whose axial direction is perpendicular to the axis of the cylinder;
- the shaft having teeth that engage with the teeth of the at least one piston, characterized in that the piston fixes the shaft in its axial direction by means of positive engagement.

13. The pneumatic actuator according to claim 12, characterized in that the shaft has at least one peripheral groove that engages with a segment of the at least one piston running in the axial direction.

14. The pneumatic actuator according to claim 12, characterized in that the shaft has two bearing sites that form the areas where the shaft has its greatest diameter.

15. The pneumatic actuator according to claim 12, characterized in that the shaft is mounted directly in the housing at two bearing sites.

Patent Claims

1. Pneumatic actuator comprising a housing (1) which has a pneumatic cylinder (6), and comprising at least one piston (4, 5) that can move inside the cylinder (6) in the direction of the axis of the cylinder (6) and, together with the cylinder (6), delimits a working space (32, 33, 34), whereby the piston (4, 5) has teeth (20) which extend in the direction of the axis, and comprising a shaft (3) which can rotate in an axial direction (2) whose axial direction (2) is perpendicular to the axis, and which has teeth (12) that engages with the teeth (20) of the piston (4, 5), **characterized in that** the piston (4,5) fixes the shaft (3) in its axial direction (2) by means of positive engagement.
2. Actuator according to claim 1, **characterized in that** the shaft (3) has at least one peripheral groove (11, 13) that engages with a segment (21) of the piston (4,5) running in the axial direction.
3. Actuator according to one of the prior claims, **characterized in that** the shaft (3) has two bearing areas (10, 14) that form the areas where the shaft (3) has the greatest diameter.
4. Actuator according to one of the prior claims, **characterized in that** the shaft (3) is mounted directly in the housing (1) at two bearing sites (22).
5. Actuator according to one of the prior claims, **characterized in that** the bearing sites (10, 14) of the shaft of (3) essentially have the same diameter.
6. Actuator according to one of the prior claims, **characterized in that** the groove (11, 13) is a peripherally cut groove.
7. Actuator according to one of the prior claims, **characterized in that** each piston (4,5) has a total of two of the segments (21) neighboring the teeth (20).

8. Actuator according to one of the prior claims, **characterized in that** the pistons (4,5) are made of plastic.
9. Actuator according to one of the prior claims, **characterized in that** the working area (33) in the area of the bearing sites (11, 14) of the shaft (3) is sealed from the exterior by means of sealing rings that are placed in a groove of the shaft (3).
10. Method to mount an actuator according to one of the prior claims, **characterized in that** first the shaft (3) is inserted in the bearing sites (22), and then the piston(s) (4,5) engage with the shaft (3).
11. Method according to claims 10, **characterized in that** the shaft (3) is held in the bearing sites (22) without additional fasteners.